

**Abstract**

The present invention relates to a torque sensor apparatus and method using variations in the microstructure of an optical waveguide affixed to the surface of a stress bearing member to measure the deflective force applied to the stress bearing member. A signal propagating through the optical waveguide is modified as a result of forces applied to the stress bearing member and to the optical waveguide. Induced changes in the index of refraction and alterations in the critical bending radius value of the optical waveguide result in modulation of the transmitted signal.